ANTENNA HOLD DEVICE

BACKGROUND OF THE INVENTION

The present invention relates to an antenna hold device for holding a transmitting and receiving antenna which is assembled from outside of a box body of electronic equipment such as radio equipment, a portable (cellular) phone or the like.

Conventionally, when a transmitting and receiving antenna to be assembled from outside of a box body of electronic equipment such as radio equipment, a portable (cellular) phone or the like is stored into the main body portion of the electronic equipment, there is not disposed an antenna hold device which is used to eliminate a clearance between the antenna and the box body of electronic equipment.

Therefore, when a receiving call is made through vibrations while the transmitting and receiving antenna is being stored within the box body of the electronic equipment, since there is present a clearance (gap) between an antenna stopper and an antenna guide, the leading end of the main body portion of the antenna is vibrated due to the above vibrations to thereby generate a strange sound (irregular sound) . That is, the electronic equipment has a vibration function, whereas vibrations generated by the vibration function also cause the antenna main body portion leading end to vibrate, thereby producing a strange sound (abnormal sound) which annoys a user. cl SUMMARY OF THE INVENTION

In solving the above problem, according to the invention, there is provided an antenna hold device comprising a transmitting and receiving antenna which can be stored within the main body portion of the present antenna hold device, and a cylindrical-shaped antenna guide for guiding the main body portion storage side of the transmitting and receiving antenna, characterized by clearance eliminating means which, when the transmitting and receiving antenna is guided to and stored in the main body portion storage side of the antenna hold device, eliminates a clearance (a gap) between the leading end of the main body portion of the transmitting and receiving antenna and the above-mentioned antenna guide.

According to the invention as set forth in Aspect 1, there is provided an antenna hold device comprising a transmitting and receiving antenna which can be stored within the main body portion of the present antenna hold device, and a cylindrical-shaped antenna guide for guiding the main body portion storage side of the transmitting and receiving antenna, characterized by clearance eliminating means which, when the transmitting and receiving antenna is guided to and stored in the main body portion storage side of the antenna hold device, eliminates a clearance (a gap) between the leading end of the main body portion of the transmitting and receiving antenna and the above-mentioned antenna guide. Thanks to this structure, there can be obtained an operational effect that, even when there is made a receiving call through vibrations, no vibration can be produced in the leading end of the antenna main body portion and thus no strange sound (irregular sound) can be generated.

Also, according to the invention as set forth in Aspect 2, in an antenna hold device as set forth in Aspect 1, there is formed a taper portion in the leading end portion of the clearance eliminating means. That is, according to the invention as set forth in Aspect 2, there can be provided an operational effect that provision of the taper portion in the leading end portion of the clearance eliminating means makes it possible to facilitate the storage of the antenna stopper of the antenna hold device.

Further, according to the invention as set forth in Aspect 3, in an antenna hold device as set forth in Aspect 1, the clearance eliminating means is disposed inside of the rear end portion of the antenna guide and is structured such that the section shape thereof increases in thickness in a direction in which the above clearance increases in size when the transmitting and receiving antenna is stored into the main body portion storage side of the antenna hold device. That is, according to the invention as set forth in Aspect 3, there can be provided an operational effect that, when making a receiving call through vibrations while the transmitting and receiving antenna is being stored, no strange sound (irregular sound) can be generated.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side section view of a portable radio phone incorporating therein an antenna hold device according to an embodiment of the invention;

FIG. **2** is a side section view of a portable radio phone incorporating therein an antenna hold device according to the embodiment of the invention, showing only the portions thereof that relate to a transmitting and receiving antenna employed in the portable radio phone shown in FIG. **1**;

FIG. **3** is a section view of an antenna hold device according to an embodiment of the invention; and,

FIG. **4** is a partially sectional view of the above antenna hold device according to the invention, showing a state thereof in which the transmitting and receiving antenna is separated from the present antenna hold device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Now, description will be given below of an embodiment of an antenna hold device according to the invention with reference to the accompanying drawings.

FIG. **1** is a side section view of a portable radio phone which is one of radio equipment and includes an antenna hold device according to the invention. In FIG. **1**, the portable radio phone comprises a transmitting and receiving antenna **1** which is used to transmit and receive a high frequency signal, and a main body portion **2**; and, the main body portion **2** of the radio phone is stored between a cover **4** and a case **5** cooperating in forming a box body **3**. In FIG. **1**, there is shown a state in which the main body portion **2** is stored within the box body **3**.

Within the box body **3**, there are further stored a receiver **9** for outputting a sound, a key sheet **7** serving as input means for inputting characters, symbols, numerals and the like, a liquid crystal display device **8** for displaying the inputted characters, symbols, numerals and the like, and a transmitter **10** together with a printed circuit board (not shown). Also, on the case **5** side of the box body **3**, there is removably mounted a battery **6** for supplying electric power to the present portable radio phone.

Now, FIG. **2** shows only the portions that relate to the transmitting and receiving antenna **1** of the portable radio phone shown in FIG. **1** according to the embodiment of the invention. In FIG. **2**, as the parts relating to the transmitting and receiving antenna **1**, there are shown an antenna top **11**, an antenna holder **12** for holding the transmitting and receiving antenna **1** in the box body **3**, an antenna sleeve **13** capable of functioning as an antenna while the transmitting